

=> index bioscience medicine

INDEX 'ADISCTI, ADISINSIGHT, ADISNEWS, AGRICOLA, ANABSTR, ANTE, AQUALINE, AQUASCI, BIOBUSINESS, BIOMERCE, BIOENG, BIOSIS, BIOTECHABS, BIOTECHDHS, BIOTECHNO, CABA, CANCERLIT, CAPLUS, CEABA-VTB, CEN, CIN, CONFSCI, CROPB, CROPU, DDFB, DDFU, DGENE, DISSABS, ...' ENTERED AT 16:06:49 ON 26 SEP 2005

=> s (n-acylhomoserine(s)lactone(s)acylase#) or (acylhomoserine(s)lactone(s)acylase#) or (AHL(s)acylase#) or AiiA or (acylhomoserine(s)lactone(s)lactonase#) or (AHL(s)lactonase#)

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6 FILE ADISNEWS  
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5 FILE BIOTECHDHS  
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65 FILE SCISEARCH  
37 FILE TOXCENTER  
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2 FILE USPAT2  
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3 FILE WPINDEX  
4 FILE IPA  
208 FILE NLDB

L1 QUE (N-ACYLHOMOSERINE(S) LACTONE(S) ACYLASE#) OR (ACYLHOMOSERINE(S) LACTONE(S) ACYLASE#) OR (AHL(S) ACYLASE#) OR AiiA OR (ACYLHOMOSERINE(S) LACTONE(S) LACTONASE#) OR (AHL(S) LACTONASE#)

=> d rank

F1	208	NLDB
F2	189	PROMT
F3	87	CAPLUS
F4	79	EMBASE
F5	78	BIOSIS
F6	77	MEDLINE
F7	65	SCISEARCH
F8	61	DRUGU
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F10 37 DDFU  
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F12 35 PASCAL  
F13 34 ESBIOBASE  
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F16 16 ADISCTI  
F17 15 DGENE  
F18 12 BIOTECHNO  
F19 12 CABA  
F20 10 AGRICOLA  
F21 10 JICST-EPLUS  
F22 8 BIOENG  
F23 6 ADISNEWS  
F24 6 CIN  
F25 6\* FEDRIP  
F26 5 BIOTECHABS  
F27 5 BIOTECHDS  
F28 4 PHIN  
F29 4 IPA  
F30 3 CEABA-VTB  
F31 3 IFIPAT  
F32 3 WPIDS  
F33 3 WPINDEX  
F34 2 EMBAL  
F35 2 NTIS  
F36 2 USPAT2  
F37 1 CROPU  
F38 1 DDFB  
F39 1 DRUGB  
F40 1 FSTA  
F41 1 IMSDRUGNEWS  
F42 1 IMSRESEARCH  
F43 1 PHIC

=> file f1-f7, f11, f13, f14, f15, f20, f8

=> s L1

L2 976 L1

=> s (gene# or sequence# or polynucleotide# or clone# or recombinant#)(s)L2  
6 FILES SEARCHED...

L3 148 (GENE# OR SEQUENCE# OR POLYNUCLEOTIDE# OR CLONE# OR RECOMBINANT#  
(S) L2

=> s (inactiv? or hydrol?)(s) L3

L4 53 (INACTIV? OR HYDROL?)(S) L3

=> dup rem L4

PROCESSING COMPLETED FOR L4

L5 20 DUP REM L4 (33 DUPLICATES REMOVED)

=> d ibib abs l5 1-20

L5 ANSWER 1 OF 20 USPATFULL on STN

ACCESSION NUMBER: 2005179006 USPATFULL

TITLE: Ralstonia ahl-acylase gene

INVENTOR(S): Zhang, Lian Hui, Singapore, SINGAPORE  
Xu, Jin Ling, Singapore, SINGAPORE  
Lin, Yi Han, Singapore, SINGAPORE

*inventor*

NUMBER KIND DATE

PATENT INFORMATION: US 2005155088 A1 20050714  
APPLICATION INFO.: US 2003-502351 A1 20020123 (10)  
WO 2002-SG11 20020123

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: ROTHWELL, FIGG, ERNST & MANBECK, P.C., 1425 K STREET,  
N.W., SUITE 800, WASHINGTON, DC, 20005, US

NUMBER OF CLAIMS: 17

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 2 Drawing Page(s)

LINE COUNT: 1379

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB This invention provides a gene, *qsbA*, which encodes a protein useful for inactivating certain bacterial quorum-sensing signal molecules (N-acyl homoserine lactones) which participate in bacterial virulence and biofilm differentiation pathways. This gene was isolated from *Ralstonia* sp., strain XJ12B. The invention also provides the QsbA protein, which possesses N-acyl homoserine lactone inactivating activity.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 2 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V. on  
STN

ACCESSION NUMBER: 2005133883 ESBIOBASE

TITLE: The quorum-quenching lactonase from *Bacillus thuringiensis* is a metalloprotein

AUTHOR: Thomas P.W.; Stone E.M.; Costello A.L.; Tierney D.L.; Fast W.

CORPORATE SOURCE: W. Fast, College of Pharmacy, University of Texas at Austin, 1 University Station, A1935, Austin, TX 78712, United States.

E-mail: WaltFast@mail.utexas.edu

SOURCE: Biochemistry, (24 MAY 2005), 44/20 (7559-7569), 49 reference(s)

CODEN: BICAWH ISSN: 0006-2960

DOCUMENT TYPE: Journal; Article

COUNTRY: United States

LANGUAGE: English

SUMMARY LANGUAGE: English

AB \*\*\*Lactonases\*\*\* from *Bacillus* species \*\*\*hydrolyze\*\*\* the N-\*\*\*acylhomoserine\*\*\* \*\*\*lactone\*\*\* ( \*\*\*AHL\*\*\* ) signaling molecules used in quorum-sensing pathways of many Gram-negative bacteria, including *Pseudomonas aeruginosa* and *Erwinia carotovora*, both significant pathogens. Because of \*\*\*sequence\*\*\* similarity, these \*\*\*AHL\*\*\* \*\*\*lactonases\*\*\* have been assigned to the metallo-*beta*-lactamase superfamily of proteins, which includes metalloenzymes of diverse activity, mechanism, and metal content. However, a recent study claims that \*\*\*AHL\*\*\* \*\*\*lactonase\*\*\* from *Bacillus* sp. 240B1 is not a metalloprotein [Wang, L. H., et al. (2004) J. Biol. Chem. 279, 13645]. Here, the \*\*\*gene\*\*\* for an \*\*\*AHL\*\*\* \*\*\*lactonase\*\*\* from *Bacillus thuringiensis* is \*\*\*cloned\*\*\*, and the protein is expressed, purified, and found to bind 2 equiv of zinc. The metal-bound form of \*\*\*AHL\*\*\* \*\*\*lactonase\*\*\* catalyzes the \*\*\*hydrolysis\*\*\* of N-hexanoyl-(S)-homoserine \*\*\*lactone\*\*\* but not the (R) enantiomer. Removal of both zinc ions results in loss of activity, and reconstitution with zinc restores activity, indicating the importance of metal ions for catalytic activity. Metal content, \*\*\*sequence\*\*\* alignments, and X-ray absorption spectroscopy of the zinc-containing \*\*\*lactonase\*\*\* all support a proposed dinuclear zinc binding site similar to that found in glyoxalase II. .COPYRGT. 2005 American Chemical Society.

L5 ANSWER 3 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V. on  
STN

ACCESSION NUMBER: 2005171460 ESBIOBASE

TITLE: Quorum quenching enzyme activity is widely conserved in the sera of mammalian species

AUTHOR: Yang F.; Wang L.-H.; Wang J.; Dong Y.-H.; Jiang Y.H.; Zhang L.-H.

CORPORATE SOURCE: Y.H. Jiang, Center for Water Research, Department of Civil Engineering, National University of Singapore, 10 Kent Ridge Crescent, Singapore 119260, Singapore.  
E-mail: lianhui@imcb.a-star.edu.sg

SOURCE: FEBS Letters, (27 JUL 2005), 579/17 (3713-3717), 32 reference(s)

CODEN: FEBLAL ISSN: 0014-5793

PUBLISHER ITEM IDENT.: S001457930500685X

DOCUMENT TYPE: Journal; Article

COUNTRY: Netherlands

LANGUAGE: English

SUMMARY LANGUAGE: English

AB Acyl-homoserine lactone ( \*\*\*AHL\*\*\* ) quorum sensing signals play a key role in synchronizing virulence \*\*\*gene\*\*\* expression in *Pseudomonas aeruginosa*, which could cause fatal bloodstream infections. We showed that \*\*\*AHL\*\*\* \*\*\*inactivation\*\*\* activity, albeit with variable efficiency, was conserved in the serum samples of all the 6 tested mammalian animals. High-performance liquid chromatography and mass spectrometry analyses revealed that mammalian sera had a \*\*\*lactonase\*\*\* -like enzyme(s), which \*\*\*hydrolyzed\*\*\* the lactone ring of \*\*\*AHL\*\*\* to produce acyl homoserine, with enzyme properties reminiscent of paraoxonases (PONs). We further showed that the animal cell lines expressing three mouse PON \*\*\*genes\*\*\*, respectively, displayed strong \*\*\*AHL\*\*\* degradation activities. .COPYRGT. 2005 Federation of European Biochemical Societies. Published by Elsevier B.V. All rights reserved.

L5 ANSWER 4 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V. on STN DUPLICATE

ACCESSION NUMBER: 2005125601 ESBIOBASE

TITLE: Identification of extracellular N-acylhomoserine lactone acylase from a *Streptomyces* sp. and its application to quorum quenching

AUTHOR: Park S.-Y.; Kang H.-O.; Jang H.-S.; Lee J.-K.; Koo B.-T.; Yum D.-Y.

CORPORATE SOURCE: D.-Y. Yum, R and D Center, INBIONET Corporation, Daejeon 305-390, South Korea.  
E-mail: dyyum@inbionet.com

SOURCE: Applied and Environmental Microbiology, (2005), 71/5  
(2632-2641), 41 reference(s)

CODEN: AEMIDF ISSN: 0099-2240

DOCUMENT TYPE: Journal; Article

COUNTRY: United States

LANGUAGE: English

SUMMARY LANGUAGE: English

AB \*\*\*N\*\*\* - \*\*\*Acylhomoserine\*\*\* lactones (AHLs) play an important role in regulating virulence factors in pathogenic bacteria. Recently, the enzymatic \*\*\*inactivation\*\*\* of AHLs, which can be used as antibacterial targets, has been identified in several soil bacteria. In this study, strain M664, identified as a *Streptomyces* sp., was found to secrete an \*\*\*AHL\*\*\* -degrading enzyme into a culture medium. The AhLM \*\*\*gene\*\*\* for \*\*\*AHL\*\*\* degradation from *Streptomyces* sp. strain M664 was \*\*\*cloned\*\*\*, expressed heterologously in *Streptomyces lividans*, and purified. The enzyme was found to be a heterodimeric protein with subunits of approximately 60 kDa and 23 kDa. A comparison of AhLM with known \*\*\*AHL\*\*\* - \*\*\*acylases\*\*\*, *Ralstonia* strain XJ12B AaiD and *Pseudomonas aeruginosa* PAO1 PvdQ, revealed 35% and 32% identities in the deduced amino acid \*\*\*sequences\*\*\*, respectively. However, AhLM was most similar to the cyclic lipopeptide \*\*\*acylase\*\*\* from *Streptomyces* sp. strain FERM BP-5809, exhibiting 93% identity. A mass spectrometry analysis demonstrated that AhLM \*\*\*hydrolyzed\*\*\* the amide bond of \*\*\*AHL\*\*\*, releasing homoserine \*\*\*lactone\*\*\*. AhLM exhibited a higher deacylation activity toward AHLs with long acyl chains rather than short acyl chains. Interestingly, AhLM was also found to be capable of degrading penicillin G by deacylation, showing that AhLM has a broad substrate specificity. The addition of AhLM to the growth medium reduced the accumulation of AHLs and decreased the production of virulence factors, including elastase, total protease, and LasA, in *P. aeruginosa*. Accordingly, these results suggest that \*\*\*AHL\*\*\* - \*\*\*acylase\*\*\*, AhLM could be effectively applied to the control of \*\*\*AHL\*\*\* -mediated pathogenicity. Copyright .COPYRGT. 2005, American Society for Microbiology. All Rights Reserved.

L5 ANSWER 5 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 2

ACCESSION NUMBER: 2005:170657 CAPLUS

TITLE: Disruption of quorum sensing in seawater abolishes attraction of zoospores of the green alga *Ulva* to bacterial biofilms

AUTHOR(S): Tait, Karen; Joint, Ian; Daykin, Mavis; Milton, Debra L.; Williams, Paul; Camara, Miguel

CORPORATE SOURCE: Plymouth Marine Laboratory, Plymouth, PL1 3DH, UK

SOURCE: Environmental Microbiology (2005), 7(2), 229-240

CODEN: ENMIFM; ISSN: 1462-2912

PUBLISHER: Blackwell Publishing Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Zoospores of the eukaryotic green seaweed *Ulva* respond to bacterial N-acylhomoserine lactone (AHL) quorum sensing signal mols. for the selection of surface sites for permanent attachment. In this study we have investigated the prodn. and destruction of AHLs in biofilms of the AHL-producing marine bacterium, *Vibrio anguillarum* and their stability in seawater. While wild type *V. anguillarum* NB10 was a strong attractor of zoospores, \*\*\*inactivation\*\*\* of \*\*\*AHL\*\*\* prodn. in this strain by either expressing the \*\*\*recombinant\*\*\* *Bacillus* \*\*\*lactonase\*\*\* coding \*\*\*gene\*\*\* \*\*\*aiiA\*\*\*, or by mutating the \*\*\*AHL\*\*\* biosynthetic \*\*\*genes\*\*\*, resulted in the abolition of zoospore attraction. In seawater, with a pH of 8.2, the degrdn. of AHL mols. was temp.-dependent, indicating that the AHLs produced by marine bacterial biofilms have short half-lives. The *Ulva* zoospores sensed a range of different AHL mols. and in particular more zoospores settled on surfaces releasing AHLs with longer (>six carbons) N-linked acyl chains. However, this finding is likely to be influenced by the differential diffusion rates of AHLs from the exptl. surface matrix. Mols. with longer N-acyl chains, such as N-(3-oxodecanoyl)-L-homoserine lactone, diffused more slowly than those with shorter N-acyl chains such as N-(3-hydroxyhexanoyl)-L-homoserine lactone. Image anal. using GFP-tagged *V. anguillarum* biofilms revealed that spores settle directly on bacterial cells and in particular on microcolonies which we show are sites of concd. AHL prodn.

REFERENCE COUNT: 42 THERE ARE 42 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 6 OF 20 USPATFULL on STN

ACCESSION NUMBER: 2004:180323 USPATFULL

TITLE: Control of bacterial infection by quenching quorum-sensing of plant pathogenic bacteria

INVENTOR(S): Zhang, Lianhui, Singapore, SINGAPORE  
Dong, Yihu, Singapore, SINGAPORE  
Xu, Junling, Singapore, SINGAPORE  
Zhang, Xifen, Singapore, SINGAPORE

NUMBER KIND DATE

PATENT INFORMATION: US 2004139495 A1 20040715

APPLICATION INFO.: US 2004-470294 A1 20040120 (10)

WO 2001-SG12 20010129

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: ROTHWELL, FIGG, ERNST & MANBECK, P.C., 1425 K STREET, N.W., SUITE 800, WASHINGTON, DC, 20005

NUMBER OF CLAIMS: 16

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 5 Drawing Page(s)

LINE COUNT: 741

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Transgenic plants, protected from bacterial pathogens, which harbor the \*\*\*aiiA\*\*\* \*\*\*gene\*\*\* or a functional fragment or a modification thereof and express functional \*\*\*AiiA\*\*\* protein were produced. The plants and plant materials of this invention \*\*\*inactivate\*\*\* bacterial pathogen quorum-sensing signal molecules, thereby eliminating or reducing the production of bacterial virulence factors which are harmful to plant cells and tissues.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 7 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V. on STN DUPLICATE

ACCESSION NUMBER: 2004100092 ESBIOBASE

TITLE: Specificity and Enzyme Kinetics of the Quorum-quenching N-Acyl Homoserine Lactone Lactonase (AHL-lactonase)

AUTHOR: Wang L.-H.; Weng L.-X.; Dong Y.-H.; Zhang L.-H.  
CORPORATE SOURCE: L.-H. Zhang, Inst. of Molecular and Cell Biology, 30  
Medical Drive, Singapore 117609, Singapore.  
E-mail: lianhui@imcb.nus.edu.sg

SOURCE: Journal of Biological Chemistry, (02 APR 2004), 279/14  
(13645-13651), 41 reference(s)

CODEN: JBCHA3 ISSN: 0021-9258

DOCUMENT TYPE: Journal; Article

COUNTRY: United States

LANGUAGE: English

SUMMARY LANGUAGE: English

AB N-Acyl homoserine lactone ( \*\*\*AHL\*\*\* ) quorum-sensing signals are the vital elements of bacterial quorum-sensing systems, which regulate diverse biological functions, including virulence. The \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\*, a quorum-quenching enzyme encoded by \*\*\*aiiA\*\*\* from *Bacillus* sp., \*\*\*inactivates\*\*\* AHLs by \*\*\*hydrolyzing\*\*\* the lactone bond to produce corresponding N-acyl homoserines. To characterize the enzyme, the \*\*\*recombinant\*\*\* \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* and its four variants were purified. Kinetic and substrate specificity analysis showed that \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* had no or little residue activity to non-acyl lactones and noncyclic esters, but displayed strong enzyme activity toward all tested AHLs, varying in length and nature of the substitution at the C3 position of the acyl chain. The data also indicate that the amide group and the ketone at the C1 position of the acyl chain of AHLs could be important structural features in enzyme-substrate interaction. Surprisingly, although carrying a .sup.1.sup.0.sup.4HX-HXDH.sup.1.sup.0.sup.9 short \*\*\*sequence\*\*\* identical to the zinc-binding motif of several groups of metallohydrolytic enzymes, \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* does not contain or require zinc or other metal ions for enzyme activity. Except for the amino acid residue His-104, which was shown previously to not be required for catalysis, kinetic study and conformational analysis using circular dichroism spectrometry showed that substitution of the other key residues in the motif (His-106, Asp-108, and His-109), as well as His-169 with serine, respectively, caused conformational changes and significant loss of enzyme activity. We conclude that \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* is a highly specific enzyme and that the .sup.1.sup.0.sup.6HXDH.sup.1.sup.0.sup.9 apprx. H.sup.1.sup.6.sup.9 of \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* represents a novel catalytic motif, which does not rely on zinc or other metal ions for activity.

L5 ANSWER 8 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2005:288141 CAPLUS

TITLE: Activity of *Bacillus thuringiensis* AiiA protein  
against soft rot disease for *Amorphophallus konjac*  
caused by *Erwinia carotovora* pv. *carotovora*

AUTHOR(S): Zhou, Yi; Sun, Ming; Yu, Zi-niu

CORPORATE SOURCE: College of Life Science and Technology, Huazhong  
Agricultural University/The National Key Laboratory of  
Agricultural Microbiology, Wuhan, Hubei, 430070, Peop.  
Rep. China

SOURCE: Wuhan Daxue Xuebao, Lixueban (2004), 50(6), 761-764

CODEN: WDXLA5, ISSN: 1671-8836

PUBLISHER: Wuhan Daxue Qikanshe

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB \*\*\*AiiA\*\*\* protein, blocking the bacterial quorum sensing by \*\*\*hydrolyzing\*\*\* AHL-lactone, can greatly attenuate the disease caused by many bacterial pathogens in which quorum sensing regulate the expression of virulence \*\*\*genes\*\*\*. The primers were designed from the sequence of aiiA gene in genome of *B. cereus* ATCC14579, and the 753 bp long gene segment was amplified from *Bacillus thuringiensis* by PCR using EX-Taq DNA polymerase. The comparability of aiiA gene from *B. thuringiensis* is very high with others. The PCR segment was inserted into expression vector pET28a(+). Then the recombinant vector pETAIiiA was introduced into *E. coli* BL21 (DE3) for expression. SDS-PAGE showed that the expression product was a band of about 28 .times. 103 protein. The expression protein greatly attenuated the pathogenesis of *E. carotovora* pv. *carotovora* CZY which can result in soft rot for *Amorphophallus konjac*.

L5 ANSWER 9 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN

ACCESSION NUMBER: 2003:656906 CAPLUS

DOCUMENT NUMBER: 139:193619

TITLE: Cloning, characterization and sequence of Ralstonia  
AHL acylase and use for treatment of bacterial  
infection in mammals and plants

INVENTOR(S): Zhang, Lian Hui; Lin, Yi Han; Xu, Jin Ling

PATENT ASSIGNEE(S): Institute of Molecular Agrobiology, Singapore

SOURCE: PCT Int. Appl., 51 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2003068951	A1	20030821	WO 2002-SG11	20020123
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1470221	A1	20041027	EP 2002-715955	20020123
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				

US 2005155088	A1	20050714	US 2003-502351	20020123
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PRIORITY APPLN. INFO.: WO 2002-SG11 W 20020123

AB This invention provides a gene, *qsbA*, which encodes a protein useful for inactivating certain bacterial quorum sensing signal mols. (N-acylhomoserine lactones) which participate in bacterial virulence and biofilm differentiation pathways. This N-acylhomoserine lactone acylase gene was isolated from *Ralstonia* sp., strain XJ12B. The nucleotide sequence of the gene *qsbA* and the amino acid sequence of the encoded N-acylhomoserine lactone acylase are provided. The gene and enzyme of the invention are useful in controlling bacterial infections in mammals and plants.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 10 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V.  
on STN DUPLICATE

ACCESSION NUMBER: 20032356913 ESBIOBASE

TITLE: Utilization of Acyl-Homoserine Lactone Quorum Signals  
for Growth by a Soil *Pseudomonad* and *Pseudomonas*  
*aeruginosa* PAO1

AUTHOR: Huang J.J.; Han J.-I.; Zhang L.-H.; Leadbetter J.R.

CORPORATE SOURCE: J.R. Leadbetter, W. M. Keck Laboratories, M/C 138-78,  
California Institute of Technology, Pasadena, CA  
91125, United States.  
E-mail: jleadbetter@caltech.edu

SOURCE: Applied and Environmental Microbiology, (2003), 69/10  
(5941-5949), 46 reference(s)  
CODEN: AEMIDF ISSN: 0099-2240

DOCUMENT TYPE: Journal; Article

COUNTRY: United States

LANGUAGE: English

SUMMARY LANGUAGE: English

AB Acyl-homoserine lactones (AHLs) are employed by several Proteobacteria as quorum-sensing signals. Past studies have established that these compounds are subject to biochemical decay and can be used as growth nutrients. Here we describe the isolation of a soil bacterium, *Pseudomonas* strain PAI-A, that degrades 3-oxododecanoyl-homoserine lactone (3OC12HSL) and other long-acyl, but not short-acyl, AHLs as sole

energy sources for growth. The small-subunit rRNA \*\*\*gene\*\*\* from strain PAI-A was 98.4% identical to that of *Pseudomonas aeruginosa*, but the soil isolate did not produce obvious pigments or AHLs or grow under denitrifying conditions or at 42.degree.C. The quorum-sensing bacterium *P. aeruginosa*, which produces both 3OC12HSL and C4HSL, was examined for the ability to utilize AHLs for growth. It did so with a specificity similar to that of strain PAI-A, i.e., degrading long-acyl but not short-acyl AHLs. In contrast to the growth observed with strain PAI-A, *P. aeruginosa* strain PAO1 growth on AHLs commenced only after extremely long lag phases. Liquid-chromatography-atmospheric pressure chemical ionization-mass spectrometry analyses indicate that strain PAO1 degrades long-acyl AHLs via an \*\*\*AHL\*\*\* \*\*\*acylase\*\*\* and a homoserine-generating HSL \*\*\*lactonase\*\*\*. A *P. aeruginosa*

\*\*\*gene\*\*\*, *pvdQ* (PA2385), has previously been identified as being a homologue of the \*\*\*AHL\*\*\* \*\*\*acylase\*\*\* described as occurring in a *Ralstonia* species. *Escherichia coli* expressing *pvdQ* catalyzed the rapid \*\*\*inactivation\*\*\* of long-acyl AHLs and the release of HSL. *P. aeruginosa* engineered to constitutively express *pvdQ* did not accumulate its 3OC12HSL quorum signal when grown in rich media. However, *pvdQ* knockout mutants of *P. aeruginosa* were still able to grow by utilizing 3OC12HSL. To our knowledge, this is the first report of the degradation of AHLs by pseudomonads or other  $\gamma$ -Proteobacteria, of \*\*\*AHL\*\*\* \*\*\*acylase\*\*\* activity in a quorum-sensing bacterium, of HSL \*\*\*lactonase\*\*\* activity in any bacterium, and of \*\*\*AHL\*\*\* degradation with specificity only towards AHLs with long side chains.

L5 ANSWER 11 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V.  
on STN DUPLICATE  
ACCESSION NUMBER: 2003158770 ESBIOBASE  
TITLE: AhlD, an N-acylhomoserine lactonase in *Arthrobacter*  
sp., and predicted homologues in other bacteria  
AUTHOR: Park S.-Y.; Lee S.J.; Oh T.-K.; Oh J.-W.; Koo B.-T.;  
Yum D.-Y.; Lee J.-K.  
CORPORATE SOURCE: D.-Y. Yum, R/D Center, inBioNET Corporation, Daejeon  
305-390, South Korea.  
E-mail: dyum@inbionet.com  
SOURCE: Microbiology, (01 JUN 2003), 149/6 (1541-1550), 36  
reference(s)  
CODEN: MROBEO ISSN: 1350-0872  
DOCUMENT TYPE: Journal; Article  
COUNTRY: United Kingdom  
LANGUAGE: English  
SUMMARY LANGUAGE: English  
AB Quorum sensing is a signalling mechanism that controls diverse biological functions, including virulence, via N- \*\*\*acylhomoserine\*\*\* \*\*\*lactone\*\*\* ( \*\*\*AHL\*\*\* ) signal molecules in Gram-negative bacteria. With the aim of isolating strains or enzymes capable of blocking quorum sensing by \*\*\*inactivating\*\*\* \*\*\*AHL\*\*\*, bacteria were screened for \*\*\*AHL\*\*\* degradation by their ability to utilize N-3-oxohexanoyl-L-homoserine \*\*\*lactone\*\*\* (OHHL) as the sole carbon source. Among four isolates, strain IBN110, identified as *Arthrobacter* sp., was found to grow rapidly on OHHL, and to degrade various AHLs with different lengths and acyl side-chain substitutions. Co-culture of *Arthrobacter* sp. IBN110 and the plant pathogen *Erwinia carotovora* significantly reduced both the \*\*\*AHL\*\*\* amount and pectate lyase activity in co-culture medium, suggesting the possibility of applying *Arthrobacter* sp. IBN110 in the control of \*\*\*AHL\*\*\*-producing pathogenic bacteria. The ahld \*\*\*gene\*\*\* from *Arthrobacter* sp. IBN110 encoding the enzyme catalysing \*\*\*AHL\*\*\* degradation was \*\*\*cloned\*\*\*, and found to encode a protein of 273 amino acids. A mass spectrometry analysis showed that AhlD probably \*\*\*hydrolyses\*\*\* the \*\*\*lactone\*\*\* ring of N-3-hexanoyl-L-homoserine \*\*\*lactone\*\*\*, indicating that AhlD is an N- \*\*\*acylhomoserine\*\*\* \*\*\*lactonase\*\*\* (AHLase). A comparison of AhlD with other known \*\*\*AHL\*\*\*-degrading enzymes, *Bacillus* sp. 240B1 \*\*\*AiiA\*\*\*, a *Bacillus thuringiensis* subsp. *kyushuensis* \*\*\*AiiA\*\*\* homologue and *Agrobacterium tumefaciens* AttM, revealed 25, 26 and 21% overall identities, respectively, in the deduced amino acid \*\*\*sequences\*\*\*. Although these identities were relatively low, the HXDH.apprseq.H.apprseq.D motif was conserved in all the AHLases, suggesting that this motif is essential for AHLase

activity. From a genome database search based on the conserved motif, putative AhID-like \*\*\*lactonase\*\*\* \*\*\*genes\*\*\* were found in several other bacteria, and \*\*\*AHL\*\*\* -degrading activities were observed in *Klebsiella pneumoniae* and *Bacillus stearothermophilus*. Furthermore, it was verified that *ahlK*, an *ahlD* homologue, encodes an \*\*\*AHL\*\*\* -degrading enzyme in *K. pneumoniae*. Accordingly, the current results suggest the possibility that AhID-like AHLases could exist in many other micro-organisms.

L5 ANSWER 12 OF 20 LIFESCI COPYRIGHT 2005 CSA on STN

ACCESSION NUMBER: 2003:39421 LIFESCI

TITLE: Acyl-homoserine lactone acylase from *Ralstonia* strain XJ12B represents a novel and potent class of quorum-quenching enzymes

AUTHOR: Lin, Y.; Xu, J.; Hu, J.; Wang, L.; Ong, S.L.; Leadbetter, J.R.; Zhang, L.

CORPORATE SOURCE: Laboratory of Biosignals and Bioengineering, Institute of Molecular and Cell Biology, and Department of Civil Engineering, National University of Singapore, 30 Medical Drive, Singapore 117609.; E-mail: lianhui@imcb.a-star.edu.sg

SOURCE: Molecular Microbiology [Mol. Microbiol.], (2003) 50(4) vol/ 47, no. 3, pp. 849-860.

ISSN: 0950-382X.

DOCUMENT TYPE: Journal

FILE SEGMENT: J

LANGUAGE: English

SUMMARY LANGUAGE: English

AB \*\*\*N\*\*\* - \*\*\*acylhomoserine\*\*\* lactones (AHLs) are used as signal molecules by many quorum-sensing Proteobacteria. Diverse plant and animal pathogens use AHLs to regulate infection and virulence functions. These signals are subject to biological \*\*\*inactivation\*\*\* by \*\*\*AHL\*\*\* - \*\*\*lactonases\*\*\* and \*\*\*AHL\*\*\* - \*\*\*acylases\*\*\*. Previously, little was known about the molecular details underlying the latter mechanism. An \*\*\*AHL\*\*\* signal- \*\*\*inactivating\*\*\* bacterium, identified as a *Ralstonia* sp., was isolated from a mixed-species biofilm. The signal \*\*\*inactivation\*\*\* encoding \*\*\*gene\*\*\* from this organism, which we call *aiiD*, was \*\*\*cloned\*\*\* and successfully expressed in *Escherichia coli* and \*\*\*inactivated\*\*\* three AHLs tested. The predicted 794-amino-acid polypeptide was most similar to the aculeacin A \*\*\*acylase\*\*\* (AAC) from *Actinoplanes utahensis* and also shared significant similarities with cephalosporin \*\*\*acylases\*\*\* and other N-terminal (Ntn) \*\*\*hydrolases\*\*\*. However, the most similar homologues of *AiiD* are deduced proteins of undemonstrated function from available *Ralstonia*, *Deinococcus* and *Pseudomonas* genomes. LC-MS analyses demonstrated that *AiiD* \*\*\*hydrolyses\*\*\* the \*\*\*AHL\*\*\* amide, releasing homoserine \*\*\*lactone\*\*\* and the corresponding fatty acid. Expression of *AiiD* in *Pseudomonas aeruginosa* PAO1 quenched quorum sensing by this bacterium, decreasing its ability to swarm, produce elastase and pyocyanin and to paralyse nematodes. Thus, \*\*\*AHL\*\*\* - \*\*\*acylases\*\*\* have fundamental implications and hold biotechnological promise in quenching quorum sensing.

L5 ANSWER 13 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 6

ACCESSION NUMBER: 2004:1006259 CAPLUS

DOCUMENT NUMBER: 143:91665

TITLE: Expression of gene *aiiA* carrying the promoter of gene *cry3Aa* in *Bacillus thuringiensis*

AUTHOR(S): Zhu, Chenguang; Sun, Ming; Yu, Ziniu

CORPORATE SOURCE: Key Laboratory of Agricultural Microbiology of Ministry of Education and Agriculture, College of Life Science and Technology, Huazhong Agricultural University, Wuhan, 430070, Peop. Rep. China

SOURCE: Shengwu Gongcheng Xuebao (2003), 19(4), 397-401

CODEN: SGXUED; ISSN: 1000-3061

PUBLISHER: Kexue Chubanshe

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB The *Bacillus thuringiensis* \*\*\*recombinant\*\*\* strain was constructed for high expression of \*\*\*AiiA\*\*\* protein (Aii = autoinducer

\*\*\*inactivity\*\*\* ). The promoter of insecticidal crystal protein coding gene cry3Aa of *B. thuringiensis*, a non-sporulation promoter that can promote the transcription earlier and longer than the promoters of other cry genes, was selected. The promoter of AiiA protein coding gene aiiA was replaced with the promoter of gene cry3Aa by overlapping PCR to form the fusion gene pro3A-aiiA. The gene pro3A-aiiA was inserted into shuttle vector pHT304 at site BamH I/Sph I to form recombinant plasmid pBMB686. The plasmid pBMB686 was introduced into *B. thuringiensis* acrystalliferous strain BMB171, and the recombinant strain BMB686 had a higher and more stable expression level of protein AiiA compared with the parental strain BMB171. The strain BMB686 exhibited stronger ability of N-acyl-homoserine lactones (AHLs) inactivation and much more effective restraint to the potato's soft rot disease caused by *Erwinia carotovora* than those of the parental strain BMB171. The results showed that the *B. thuringiensis* strain harvesting the fusion gene pro3A-aiiA may be used in the future to control bacterial diseases which are mediated by the AHL quorum-sensing signals.

L5 ANSWER 14 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 7

ACCESSION NUMBER: 2002:595023 CAPLUS

DOCUMENT NUMBER: 137:152497

TITLE: Method for controlling pathogenic bacterial quorum-sensing by aiiA gene expression in transgenic tobacco and potato plants

INVENTOR(S): Zhang, Lianhui; Dong, Yihu; Xu, Jinling; Zhang, Xifen

PATENT ASSIGNEE(S): Institute of Molecular Agrobiology, Singapore

SOURCE: PCT Int. Appl., 38 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2002061099	A1	20020808	WO 2001-SG12	20010129
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP 1358340	A1	20031105	EP 2001-906508	20010129
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
US 2004139495	A1	20040715	US 2004-470294	20040120

PRIORITY APPLN. INFO.: WO 2001-SG12 W 20010129

AB Transgenic plants, protected from bacterial pathogens which harbor the \*\*\*aiiA\*\*\* \*\*\*gene\*\*\* or a functional fragment or modification thereof and express functional \*\*\*AiiA\*\*\* protein (autoinducer \*\*\*inactivation\*\*\* protein) were produced. The plants and plant materials of this invention inactivate bacterial pathogen quorum-sensing signal mols., thereby eliminating or reducing the prodn. of bacterial virulence factors which are harmful to plant cells and tissues.

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 15 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V.

on STN DUPLICATE

ACCESSION NUMBER: 2002083497 ESBIOBASE

TITLE: Genetic control of quorum-sensing signal turnover in *Agrobacterium tumefaciens*

AUTHOR: Zhang H.-B.; Wang L.-H.; Zhang L.-H.

CORPORATE SOURCE: L.-H. Zhang, Laboratory of Biosignals and Bioeng., Institute of Molecular Agrobiology, National University of Singapore, 1 Research Link, Singapore 117604, Singapore.

E-mail: lianhui@ima.org.sg  
SOURCE: Proceedings of the National Academy of Sciences of the  
United States of America, (02 APR 2002), 99/7  
(4638-4643), 41 reference(s)  
CODEN: PNASA6 ISSN: 0027-8424

DOCUMENT TYPE: Journal; Article

COUNTRY: United States

LANGUAGE: English

SUMMARY LANGUAGE: English

AB A signal turnover system is an essential component of many genetic regulatory mechanisms. The best-known example is the ubiquitin-dependent protein degradation system that exists in many organisms. We found that *Agrobacterium tumefaciens* adopts a unique signal turnover system to control exiting from a quorum-sensing mode. *A. tumefaciens* regulates Ti plasmid conjugal transfer by a quorum-sensing signal, N-3-oxo-octanoyl homoserine \*\*\*lactone\*\*\* (3OC8HSL), also known as *Agrobacterium* autoinducer. By using Tn5 mutagenesis and a functional cloning approach, we identified two \*\*\*genes\*\*\* that are involved in switching from a conjugal quorum-sensing mode to a nonconjugal mode at the onset of stationary phase. First, we located attJ, which codes for an IclR-type suppressor that regulates the second \*\*\*gene\*\*\* attM. The latter encodes a homologue of N- \*\*\*acylhomoserine\*\*\* \*\*\*lactone\*\*\* ( \*\*\*AHL\*\*\* )- \*\*\*lactonase\*\*\*. Mass spectrometry analysis shows that the enzyme encoded by attM is an \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* that \*\*\*hydrolyzes\*\*\* the \*\*\*lactone\*\*\* ring of 3OC8HSL. In wild-type *A. tumefaciens*, attM expression is initially suppressed by AttJ but significantly elevated at the stationary phase accompanied a sharp decline in 3OC8HSL. DNA gel retardation analysis shows that AttJ specifically binds to the promoter that controls \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* expression. Mutation of attJ resulted in constitutive production of \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* that abolishes 3OC8HSL accumulation and Ti plasmid transfer. These data suggest that *A. tumefaciens* has a sophisticated multicomponent quorum-sensing signal turnover system, allowing the cell to sense a change in growth and adjust cellular activities accordingly.

L5 ANSWER 16 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 9  
ACCESSION NUMBER: 2002:295668 CAPLUS

DOCUMENT NUMBER: 137:29791

TITLE: Identification of quorum-quenching N-acyl homoserine lactonases from *Bacillus* species

AUTHOR(S): Dong, Yi-Hu; Gusti, Andi R.; Zhang, Qiong; Xu, Jin-Ling; Zhang, Lian-Hui

CORPORATE SOURCE: Institute of Molecular Agrobiology, National University of Singapore, Singapore, 117604, Singapore

SOURCE: Applied and Environmental Microbiology (2002), 68(4), 1754-1759

CODEN: AEMIDF; ISSN: 0099-2240

PUBLISHER: American Society for Microbiology

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A range of gram-neg. bacterial species use N-acyl homoserine lactone (AHL) mols. as quorum-sensing signals to regulate different biol. functions, including prodn. of virulence factors. AHL is also known as an autoinducer. An autoinducer \*\*\*inactivation\*\*\* \*\*\*gene\*\*\*, \*\*\*aiiA\*\*\*, coding for an \*\*\*AHL\*\*\* \*\*\*lactonase\*\*\*, was \*\*\*cloned\*\*\* from a bacterial isolate, *Bacillus* sp. strain 240B1. Here we report identification of more than 20 bacterial isolates capable of enzymic inactivation of AHLs from different sources. Eight isolates showing strong AHL-inactivating enzyme activity were selected for a preliminary taxonomic anal. Morphol. phenotypes and 16S ribosomal DNA sequence anal. indicated that these isolates probably belong to the species *Bacillus thuringiensis*. Enzymic anal. with known *Bacillus* strains confirmed that all of the strains of *B. thuringiensis* and the closely related species *B. cereus* and *B. mycoides* tested produced AHL-inactivating enzymes but *B. fusiformis* and *B. sphaericus* strains did not. Nine genes coding for AHL inactivation were cloned either by functional cloning or by a PCR procedure from selected bacterial isolates and strains. Sequence comparison of the gene products and motif anal. showed that the gene products belong to the same family of AHL lactonases.

REFERENCE COUNT: 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 17 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 10

ACCESSION NUMBER: 2001:31654 CAPLUS

DOCUMENT NUMBER: 134:96283

TITLE: Cloning of a *Bacillus* autoinducer \*\*\*inactivation\*\*\* protein \*\*\*AiiA\*\*\* \*\*\*gene\*\*\* and its mutagenesis and expression for agricultural application

INVENTOR(S): Zhang, Lian-Hui; Dong, Yihu; Xu, Jinling

PATENT ASSIGNEE(S): Institute of Molecular Agrobiology of 1 Research Link, Singapore

SOURCE: PCT Int. Appl., 49 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001002578	A1	20010111	WO 1999-SG128	19991117
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
SG 91822	A1	20021015	SG 1999-3146	19990702
CA 2378153	AA	20010111	CA 1999-2378153	19991117
BR 9917419	A	20020402	BR 1999-17419	19991117
EP 1192256	A1	20020403	EP 1999-958619	19991117
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
TR 200103820	T2	20020521	TR 2001-200103820	19991117
JP 2003504028	T2	20030204	JP 2001-508350	19991117
RU 2236462	C2	20040920	RU 2002-102558	19991117
NZ 516516	A	20041029	NZ 1999-516516	19991117
AU 780185	B2	20050303	AU 2000-15948	19991117
NO 2001006397	A	20020221	NO 2001-6397	20011227
PRIORITY APPLN. INFO.:			SG 1999-3146	A 19990702
			WO 1999-SG128	W 19991117

AB Disclosed are a *Bacillus* autoinducer \*\*\*inactivation\*\*\* protein ( \*\*\*AiiA\*\*\* ) \*\*\*gene\*\*\* isolated from *Bacillus* sp. 240B1 capable of enzymic \*\*\*inactivation\*\*\* of N-acylhomoserine lactones, known as autoinducers (Als), which are involved in the regulation of pathogenic \*\*\*gene\*\*\* expression in the plants. Sequence alignment indicates that AiiA contains a "HXHxDH" zinc-binding motif that is conserved in several groups of metallohydrolases. Site-directed mutagenesis showed that conserved aspartate and most histidine residues are required for AiiA activity. Expression of aiiA in transformed *Erwinia carotovora* strain SCG1 significantly reduces the release of Al, decreases extracellular pectolytic enzyme activities, and attenuates pathogenicity on potato, eggplant, Chinese cabbage, carrot, celery, cauliflower, and tobacco. These results indicate that the Al-inactivation approach represents a promising strategy for prevention of diseases in which virulence is regulated by Als.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 18 OF 20 Elsevier BIOBASE COPYRIGHT 2005 Elsevier Science B.V. on STN DUPLICATE

ACCESSION NUMBER: 2001146971 ESBIOBASE

TITLE: Quenching quorum-sensing-dependent bacterial infection by an N-acyl homoserine lactonase

AUTHOR: Dong Y.-H.; Wang L.-H.; Xu J.-L.; Zhang H.-B.; Zhang

X.-F.; Zhang L.-H.  
CORPORATE SOURCE: L.-H. Zhang, Laboratory of Biosignals, Institute of  
Molecular Agrobiology, National University of  
Singapore, 117604 Singapore, Singapore.

E-mail: lianhui@ima.org.sg

SOURCE: Nature, (14 JUN 2001), 411/6839 (813-817), 28

reference(s)

CODEN: NATUAS ISSN: 0028-0836

DOCUMENT TYPE: Journal; Article

COUNTRY: United Kingdom

LANGUAGE: English

SUMMARY LANGUAGE: English

AB Bacterial cells sense their population density through a sophisticated cell-cell communication system and trigger expression of particular \*\*\*genes\*\*\* when the density reaches a threshold. This type of \*\*\*gene\*\*\* regulation, which controls diverse biological functions including virulence, is known as quorum sensing. Quorum-sensing signals, such as acyl-homoserine lactones (AHLs), are the essential components of the communication system. AHLs regulate virulence \*\*\*gene\*\*\* expression in a range of plant and animal (including human) bacterial pathogens. \*\*\*AHL\*\*\* -producing tobacco restored the pathogenicity of an \*\*\*AHL\*\*\* -negative mutant of *Erwinia carotovora*. Different bacterial species may produce different AHLs, which vary in the length and substitution of the acyl chain but contain the same homoserine lactone moiety. Here we show that the acyl-homoserine \*\*\*lactonase\*\*\* ( \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* ), a new enzyme from *Bacillus* sp., \*\*\*inactivates\*\*\* \*\*\*AHL\*\*\* activity by \*\*\*hydrolysing\*\*\* the lactone bond of AHLs. Plants expressing \*\*\*AHL\*\*\* - \*\*\*lactonase\*\*\* quenched pathogen quorum-sensing signalling and showed significantly enhanced resistance to *E. carotovora* infection. Our results highlight a promising potential to use quorum-sensing signals as molecular targets for disease control, thereby broadening current approaches for prevention of bacterial infections.

L5 ANSWER 19 OF 20 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on  
STN

ACCESSION NUMBER: 2001:443330 BIOSIS

DOCUMENT NUMBER: PREV200100443330

TITLE: Quenching quorum sensing-dependent bacterial infection.

AUTHOR(S): Lian-Hui, Z. [Reprint author]

CORPORATE SOURCE: Institute of Molecular Agrobiology, National University of Singapore, Singapore, Singapore

SOURCE: Phytopathology, (June, 2001) Vol. 91, No. 6 Supplement, pp.

S160. print.

Meeting Info.: Joint Meeting of the American Phytopathological Society, the Mycological Society of America, and the Society of Nematologists. Salt Lake City, Utah, USA. August 25-29, 2001. American Phytopathological Society; Mycological Society of America; Society of Nematologists.

CODEN: PHYTAJ. ISSN: 0031-949X.

DOCUMENT TYPE: Conference; (Meeting)  
Conference; Abstract; (Meeting Abstract)

LANGUAGE: English

ENTRY DATE: Entered STN: 19 Sep 2001

Last Updated on STN: 22 Feb 2002

AB Bacterial cells sense their population density via a sophisticated cell-cell communication system, and trigger expression of particular genes when the density reaches a threshold. This type of gene regulation, which controls diverse biological functions including virulence, is known as quorum sensing. Quorum-sensing signals, such as acyl-homoserine lactones (AHLs), are the essential components of the systems. AHLs regulate virulence gene expression in a range of plant and animal (including human) bacterial pathogens. It appears that single-celled bacterial pathogens use quorum-sensing signals to synchronize virulence gene expression among family members as a concerted means to overwhelm host defenses. Quorum-sensing system thus represents a fascinating target for development of novel antipathogenic approaches. Recently, we showed that the \*\*\*aiiA\*\*\* \*\*\*gene\*\*\* from a gram-positive *Bacillus* sp. 240B1 encoded an enzyme capable of \*\*\*inactivating\*\*\* several AHLs. To test

the feasibility of establishing a generic "quorum quenching" approach to control bacterial infection, i.e., to paralyze quorum-sensing systems of bacterial pathogens via inactivation of quorum-sensing signals, we have tested the effect of AiiA on different AHL signals, and introduced aiiA to potato and tobacco plants. The results on characterization of AiiA inactivation of AHL signals and the effect of the enzyme on bacterial infection will be presented.

L5 ANSWER 20 OF 20 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 12

ACCESSION NUMBER: 2000:231970 CAPLUS

DOCUMENT NUMBER: 133:14397

TITLE: AiiA, an enzyme that inactivates the acylhomoserine lactone quorum-sensing signal and attenuates the virulence of *Erwinia carotovora*

AUTHOR(S): Dong, Yi-Hu; Xu, Jin-Ling; Li, Xian-Zhen; Zhang, Lian-Hui

CORPORATE SOURCE: Institute of Molecular Agrobiology, 1 Research Link, The National University of Singapore, Singapore, 117604, Singapore

SOURCE: Proceedings of the National Academy of Sciences of the United States of America (2000), 97(7), 3526-3531

CODEN: PNASA6; ISSN: 0027-8424

PUBLISHER: National Academy of Sciences

DOCUMENT TYPE: Journal

LANGUAGE: English

AB N-acylhomoserine lactones, known as autoinducers (Als), are widely conserved signal mols. present in quorum-sensing systems of many Gram-neg. bacteria. Als are involved in the regulation of diverse biol. functions, including expression of pathogenic genes in the plant pathogens *Pseudomonas solanacearum*, several *Erwinia* species, and the human pathogen *Pseudomonas aeruginosa*. A bacterial isolate, *Bacillus* sp. 240B1, is capable of enzymic inactivation of Als. The \*\*\*gene\*\*\* ( \*\*\*aiiA\*\*\* ) for Al \*\*\*inactivation\*\*\* from *Bacillus* sp. 240B1 has been \*\*\*cloned\*\*\* and shown to encode a protein of 250 amino acids. Sequence alignment indicates that AiiA contains a "HXXHxDH" zinc-binding motif that is conserved in several groups of metallohydrolases. Site-directed mutagenesis showed that conserved aspartate and most histidine residues are required for AiiA activity. Expression of aiiA in transformed *Erwinia carotovora* strain SCG1 significantly reduces the release of Al, decreases extracellular pectolytic enzyme activities, and attenuates pathogenicity on potato, eggplant, Chinese cabbage, carrot, celery, cauliflower, and tobacco. Our results indicate that the Al-inactivation approach represents a promising strategy for prevention of diseases in which virulence is regulated by Als.

REFERENCE COUNT: 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d his

L1 QUE (N-ACYLHOMOSERINE(S) LACTONE(S) ACYLASE#) OR (ACYLHOMOSERIN

FILE NLDB, PROMT, CAPLUS, EMBASE, BIOSIS, MEDLINE, SCISEARCH, TOXCENTER, ESBIOBASE, USPATFULL, LIFESCI, AGRICOLA, DRUGU ENTERED AT 16:12:44 ON 26 SEP 2005

L2 976 S L1

L3 148 S (GENE# OR SEQUENCE# OR POLYNUCLEOTIDE# OR CLONE# OR RECOMBINA

L4 53 S (INACTIV? OR HYDROL?)(S) L3

L5 20 DUP REM L4 (33 DUPLICATES REMOVED)

=> log y

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# NiceZyme View of ENZYME: EC 3.5.1.14

**Official Name**
**Aminoacylase.**
**Alternative Name(s)**
**Acylase I.**
**Aminoacylase I.**
**Benzamidase.**
**Dehydropeptidase II.**
**Hippuricase.**
**Histozyme.**
**Reaction catalysed**

 An N-acyl-L-amino acid + H<sub>2</sub>O  $\leftrightarrow$  a carboxylate + an L-amino acid

**Comment(s)**

- Wide specificity; also hydrolyzes dehydropeptides.
- Used in separating D- and L-amino acids.

**Cross-references**
**PROSITE** [PDOC00613](#)
**BRENDA** [3.5.1.14](#)
**PUMA2** [3.5.1.14](#)
**PRIAM enzyme-specific profiles** [3.5.1.14](#)
**Kyoto University LIGAND chemical database** [3.5.1.14](#)
**IUBMB Enzyme Nomenclature** [3.5.1.14](#)
**IntEnz** [3.5.1.14](#)
**MEDLINE** [Find literature relating to 3.5.1.14](#)
**UniProtKB/Swiss-Prot** [Q03154, ACY1\\_HUMAN](#); [P37111, ACY1\\_PIG](#); [P37112, AMAA\\_BACST](#),  
[P37356, AMAA\\_BACTR](#);

[View entry in original ENZYME format](#)
[All UniProtKB/Swiss-Prot entries referenced in this entry, with possibility to download in different formats, align etc.](#)
[All ENZYME / UniProtKB/Swiss-Prot entries corresponding to 3.5.1.-](#)

KEGG

ENZYME: 3.5.1.14

Help

**Entry** EC 3.5.1.14 **Enzyme**

**Name** aminoacylase;  
dehydropeptidase II;  
histozyme;  
hippuricase;  
benzamidase;  
acylase I;  
hippurase;  
amido acid deacylase;  
L-aminoacylase;  
acylase;  
aminoacylase I;  
L-amino-acid acylase;  
alpha-N-acylaminoacid hydrolase;  
long acyl amidoacylase;  
short acyl amidoacylase

**Class** Hydrolases  
Acting on carbon-nitrogen bonds, other than peptide bonds  
In linear amides

**Sysname** N-acyl-L-amino-acid amidohydrolase

**Reaction** An N-acyl-L-amino acid + H<sub>2</sub>O = a carboxylate + an L-amino acid  
[RN:R00669 R01263]

**Substrate** N-acyl-L-amino acid [CPD:C02850]  
H<sub>2</sub>O [CPD:C00001]

**Product** carboxylate [CPD:C00060]  
L-amino acid [CPD:C00151]

**Comment** Wide specificity; also hydrolyses dehydropeptides. Used in separating D- and L- amino acids

**Pathway** PATH: map00220 Urea cycle and metabolism of amino groups

**Ortholog** KO: K01436 aminoacylase

**Genes** HSA: 95 (ACY1)  
MMU: 109652 (Acy1)  
DRE: 393970  
DME: CG17109-PA (Dmel\_CG17109) CG17110-PA (Dmel\_CG17110)  
CG6733-PA (Dmel\_CG6733)  
CEL: C10C5.3 C10C5.4 C10C5.5  
ATH: At1g44180(T7O23.14) At1g44820(T12C22.9) At4g38220(F20D10.340)  
CME: CMA011C  
DDI: DDB0201767  
TCR: 506363.70 506363.80 506363.90 506975.30 506975.40  
ECO: b1337(abgB)  
SSN: SSO\_1793(ydaJ)  
FTU: FTT1191  
REU: Reut\_A1358  
BME: BMEI0033 BMEI0034 BMEI1827  
GOX: GOX1176 GOX2239  
BAN: BA1392(amaA)  
BAR: GBAA1392(amaA)  
BAA: BA\_1294 BA\_1916  
BAT: BAS0672 BAS1289

BCE: BC0701 BC1374 BC3664  
BCA: BCE0775 BCE1490(amaA) BCE3698(hipO)  
BCZ: BCZK0616(amaA) BCZK1263(amaA) BCZK2908(amaA) BCZK3370(amaA)  
BTK: BT9727\_0616(amaA) BT9727\_1261(amaA) BT9727\_2973(amaA)  
BT9727\_2974 BT9727\_3419  
BLD: BLi04023  
BCL: ABC0022 ABC1615 ABC1855 ABC2804  
GKA: GK3242 GK3251  
LPL: lp\_3044(amd)  
FNU: FN0590 FN0702 FN0703 FN1063  
LIL: LA2674  
LIC: LIC11318(amaA)  
PMN: PMN2A\_1190  
TTH: TTC0133  
PTO: PTO0772 PTO1086

**Disease** MIM: 104620 Aminoacylase-1

**Motif** PS: PS00758 [LIV]-[GALMY]-[LIVMF]-x-[GSA]-H-x-D-[TV]-[STAV]  
PS: PS00759 [GSTAI]-[SANQ]-D-x-K-[GSACN]-x(2)-[LIVMA]-x(2)-  
[LIVMFY]-x(14,17)-[LIVM]-x-[LIVMF]-[LIVMSTAG]-[LIVMFA]-  
x(2)-[DNG]-E-E-x-[GSTN]

**Structures** PDB: 1Q7L 1YSJ

**Reference** 1

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Park, R.W. and Fox, S.W. An acylase system related to the  
utilization of benzoylamino acids by Lactobacillus arabinosus. J.  
Biol. Chem. 235 (1960) 3193-3197.

**Other DBs** IUBMB Enzyme Nomenclature: 3.5.1.14

ExPASy - ENZYME nomenclature database: 3.5.1.14

ERGO genome analysis and discovery system: 3.5.1.14

BRENDA, the Enzyme Database: 3.5.1.14

CAS: 9012-37-7

**LinkDB**

All DBs

=> Original format

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DBGET integrated database retrieval system, GenomeNet